

09/937260

PATENT

Attorney Docket No. 213503

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Per Bruun Famme

Group No.: Unassigned

Application No. Unassigned
National Phase of PCT/DK00/00132

Examiner: Unassigned

Filed: September 21, 2001

For: A Method For Leakage Control And
Localisation Of Leakages In The Internal
Faces Of Heat Exchangers

PENDING CLAIMS AFTER ENTRY OF PRELIMINARY AMENDMENT

1. A method for leakage control of the internal faces that separate the primary and secondary sides of a plate heat exchanger comprising the steps of:
supplying a colorant-containing liquid to one of the primary and secondary sides,
supplying a clear liquid that is recycled to the opposite side,
maintaining a differential pressure between the primary and secondary sides close to or approximately the same as the differential pressures prevailing during actual operation of the heat exchanger, and
determining whether leakages in the plate heat exchanger are present by detecting the presence of the colorant in the clear liquid.
2. A method for localization of leakages between the primary and secondary sides of a plate heat exchanger by use of a colorant that passes through the leakage and is subsequently detected visually comprising the steps of,
supplying a colorant-containing liquid to the primary side of the plate heat exchanger,
pressurizing the primary side for a period of time,
draining the colorant-containing liquid from the plate heat exchanger, and
determining the location of leakages by visual inspection of the plates.
3. A method according to claim 2, further comprising the step of:
maintaining a differential pressure between the primary and secondary sides close to or identical with the differential pressures prevailing during actual operation of the plate heat exchanger.

09/937260-11501

4. A method according to claim 1 wherein the viscosity of the colorant-containing liquid corresponds to the viscosity of the liquid that passes through the corresponding side of the plate heat exchanger in actual operation.

5. A method according to claim 1 wherein the passage of the colorant-containing liquid corresponds to the passage on the corresponding side of the plate heat exchanger in actual operation.

6. A method according to claim 1 wherein the colorant is a fluorescent substance.

7. A method according to claim 1 wherein the detection of the colorant is effected by use of UV-light.

8. A method according to claim 1 wherein the colorant is a salt of fluoresceine.

9. A method for in situ leakage control and localisation of leakages in the internal faces that separate the primary and secondary sides of a plate heat exchanger comprising the steps of:

supplying a colorant-containing liquid to one of the primary and second sides of the plate heat exchanger;

supplying a recycled clear liquid to the opposite side of the plate heat exchanger;

maintaining the differential pressure between the primary and secondary sides of the plate heat exchanger close to or identical with the differential pressures prevailing during actual operation of the heat exchanger;

detecting the presence of leakages in the plate heat exchanger by detection of the presence of the colorant in the clear liquid;

maintaining the colorant-containing liquid at a predetermined pressure for a period of time, while the clear liquid is drained from the opposite side; and

draining and disassembling the plate heat exchanger to determine the location of the leakages by visual inspection of the plates.

10. A method as in claim 8 wherein the salt of fluorescence is a sodium salt uranine thereof.

11. A method according to claim 2 wherein the viscosity of the colorant-containing liquid corresponds to the viscosity of the liquid that passes through the corresponding side of the plate heat exchanger in actual operation.

12. A method according to claim 2 wherein the passage of the colorant-containing liquid corresponds to the passage on the corresponding side of the plate heat exchanger in actual operation.

13. A method according to claim 2 wherein the colorant is a fluorescent substance.

14. A method according to claim 2 wherein the detection of the colorant is effected by use of UV-light.

00937260-11501

15. A method according to claim 2 wherein the colorant is a salt of fluoresceine, the sodium salt uranine thereof.

16. A method as in claim 8 wherein the salt of fluorescence is a sodium salt uranine thereof.

00937260-111501